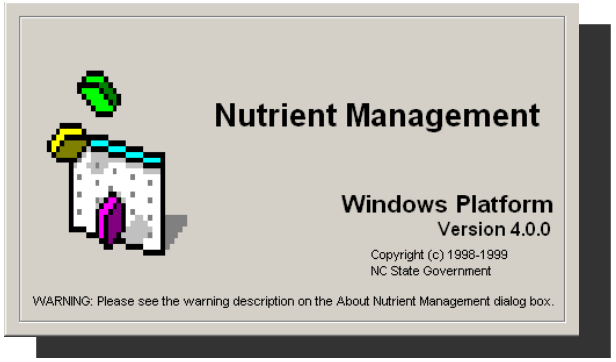
Using the N.C. Nutrient Management Software to develop a Cleanout or Closure Plan for Lagoon Sludge

Module 6

Lagoon Sludge Cleanout/Closure



References **(with active hyperlinks)**

- SB1217 9th Guidance Document – Section 1.26 SLUDGE REMOVAL PLANNING, Appendix 1.26B DSWC Copper and Zinc Projection Worksheet

- NCCES Extension Publication AG639W: 'Sludge Survey Methods for Anaerobic Lagoons'.

- NCCES Extension Publication AG604: 'Sludge Management & Closure Procedures for Anaerobic Lagoons'.

- NRCS Conservation Practice Standard Code 360: Closure of Waste Impoundments.

- NC DWQ Sludge Survey Forms (Revised August 2008): Appendix 1. Lagoon Sludge Survey Form, Appendix 2. Sludge Survey Data Sheet, Appendix 3. Worksheet for sludge volume and treatment volume.

- NC DWQ Form SPOA 3-22-2010: Plan Of Action (POA) For Lagoon Sludge Reduction.

- Sludge Removal Contractors in N.C.: http://www.bae.ncsu.edu/programs/extension/manure/sludge/sludgejockeys.html

Sludge Non-Compliance (DWQ)

If sludge accumulation in the treatment volume exceeds 50% of the planned treatment volume, the sludge should either be removed or managed in accordance with a DWQ-approved Sludge Management/Operation Plan.

1.26 Sludge Removal Planning

Excerpts from SB1217 9th Guidance Document

Periodic sludge removal:

A Technical Specialist develops A WUP conditional amendment that outlines sludge removal and land application procedures.

The amendment including calculations, application rates, sludge survey measurements, maps and other related documents are considered part of the CAWMP; must contain the items noted in section 1.6; and must be based on the following items and/or considerations:

1.26 Sludge Removal Planning

Excerpts from SB1217 9th Guidance Document

- **The method of removal will have a significant impact on volume and nutrient concentration of material removed:** agitation and pumping will result in a high volume of slurry (sludge and liquid), versus dredging which results in a lesser volume (sludge and some liquid).

***Volume estimates and waste sampling should appropriately reflect the material (solid vs. liquid) that will be applied*.**

1.26 Sludge Removal Planning

Excerpts from SB1217 9th Guidance Document

• **Sludge should be applied only to fields not used for continual animal waste application** to prevent prohibitive phosphorus and persistent metal build-up. If applied on fields already listed in the CAWMP the applications are to be recorded as part of the annual nutrient budget for that field.

• **Obtain representative sludge and liquid analysis prior to sludge removal** to accurately determine PAN, P, Cu and Zn.

• **Soil samples** obtained (1) within the 24 mo. prior to sludge application and (2) following the most recent waste application prior to the proposed sludge application. Use this report to estimate persistent metal (Cu & Zn) effects on soil indices.

1.26 Sludge Removal Planning

Excerpts from SB1217 9th Guidance Document

• **Estimate potential increases in levels of copper and zinc in soils** during plan development. The DSWC Copper and Zinc Projection Worksheet (Appendix 1.26B) may be used to provide a conservative estimate of increase in soil index values. Due to inherent variability of waste/soil sampling, it is recommended that conservative soil target levels be set for copper (e.g. Cu-I < 700-1000) and zinc (e.g. Zn-I < 300 for land where peanuts may be grown; for other cropland Zn-I < 700-1000).

• **New fields** receiving animal waste or sludge for the first time **must meet current setbacks, buffers** and **other requirements** as described in sections 1.8 and 8.1 (SB1217 9th Guidance Document).

1.26 Sludge Removal Planning

Excerpts from SB1217 9th Guidance Document

• Provisions must be taken to **prevent damage** to lagoon dikes and liner.

• If sludge is applied on **conventionally tilled bare soil**, the waste shall be **soil-incorporated within 2 days** after application or before the next rainfall event, whichever is first.

• Permittee is to **document sludge applications** to all fields (owned/leased) in the sludge plan **and balance priority nutrients using** a current waste analysis (within 60 days), on SLUR-1/SLUR-2 forms, or other DWQ-approved forms.

1.26 Sludge Removal Planning

Excerpts from SB1217 9th Guidance Document

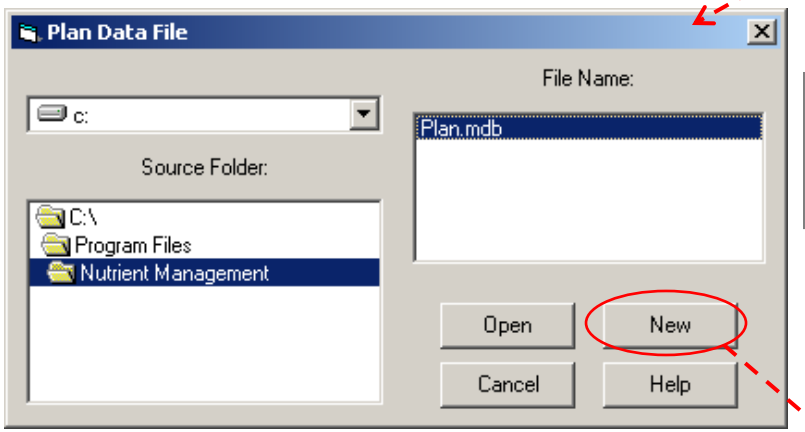
• For NPDES, and other subject facilities (identified by DWQ), **PLAT** must be completed and all applicable standards met.

• For **sludge transfers**, the **Permittee** must document the name and address of the recipient, and volume of sludge removed. The third party receiver is to be provided with a current sludge/liquid waste analyses and information for proper land application as required by the farm's permit.

• The **third party receiver** is responsible for obtaining coverage under the appropriate DWQ permit, and for the documentation and proper land application of the sludge on the approved site(s).

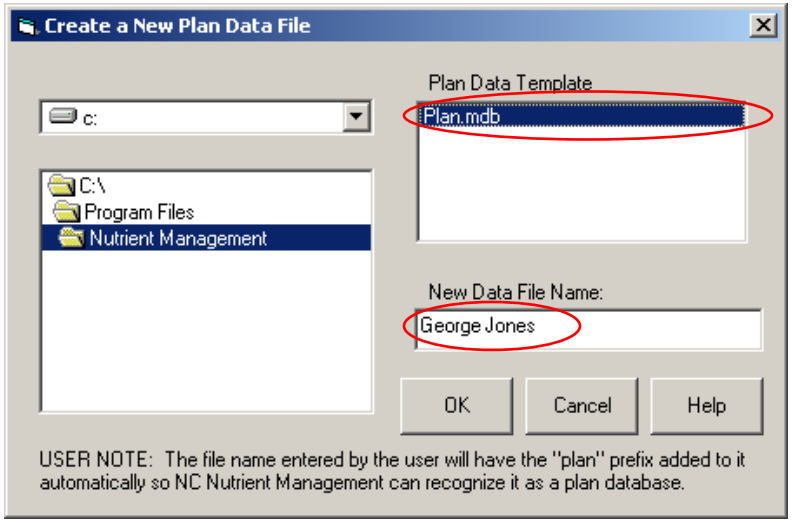
Create a New Data File

1) Double-click the **Icon** and the Plan Data File box will appear.

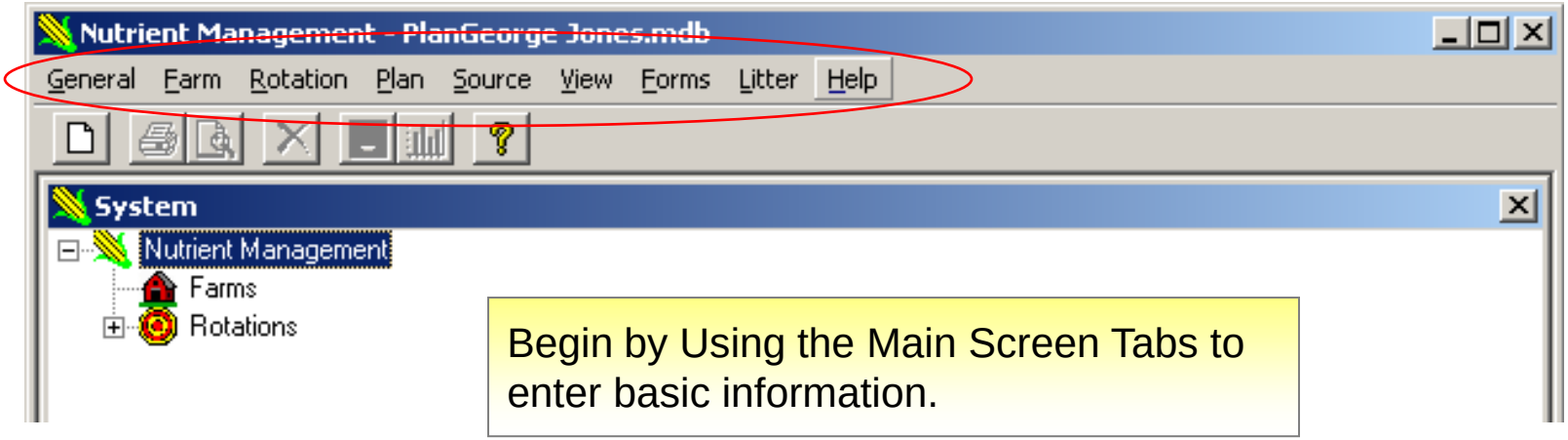


2) Click on "New"

3) Select the Plan.mdb Template and name the New Data File (often the producer's first and last name).

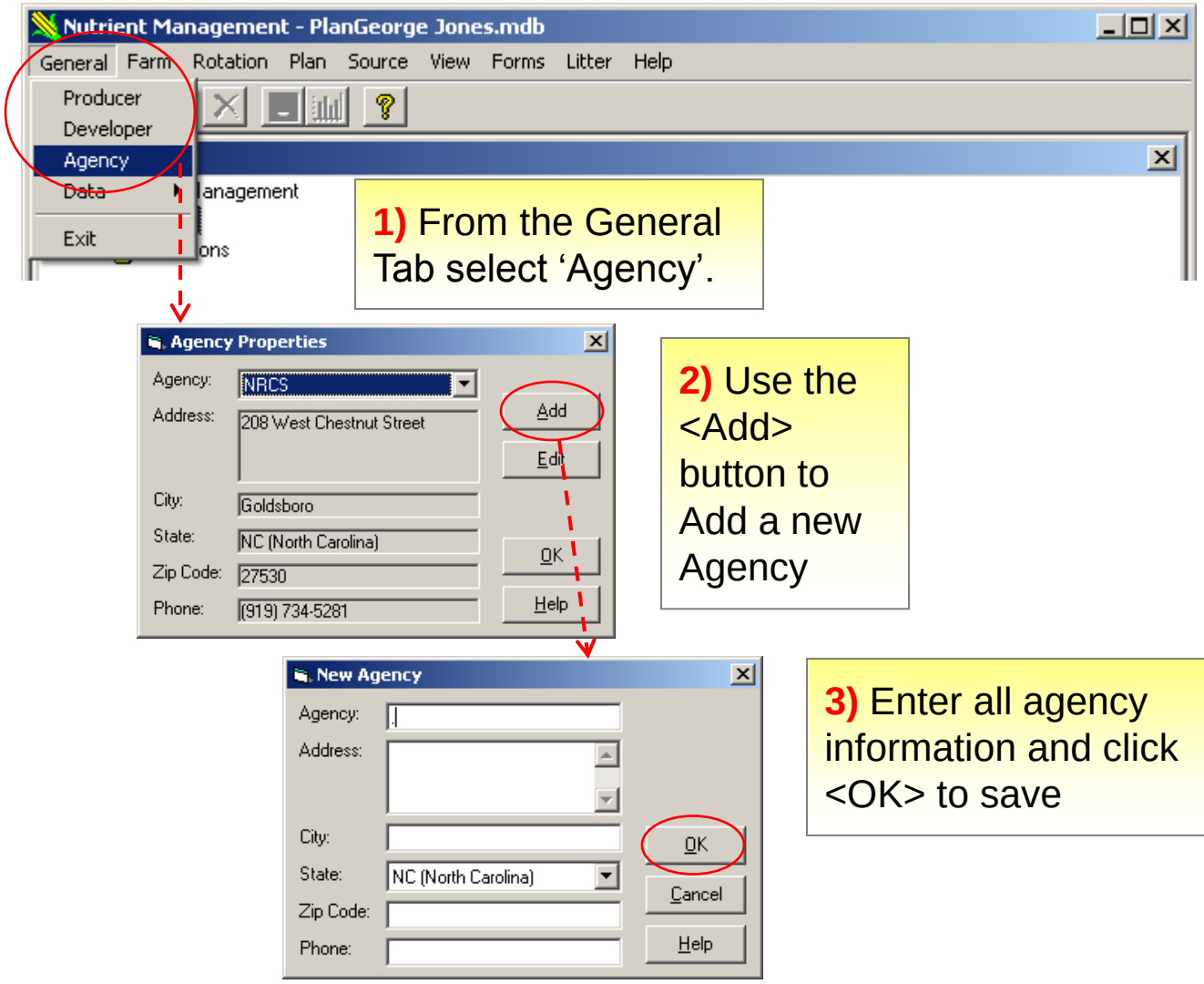


Main Screen

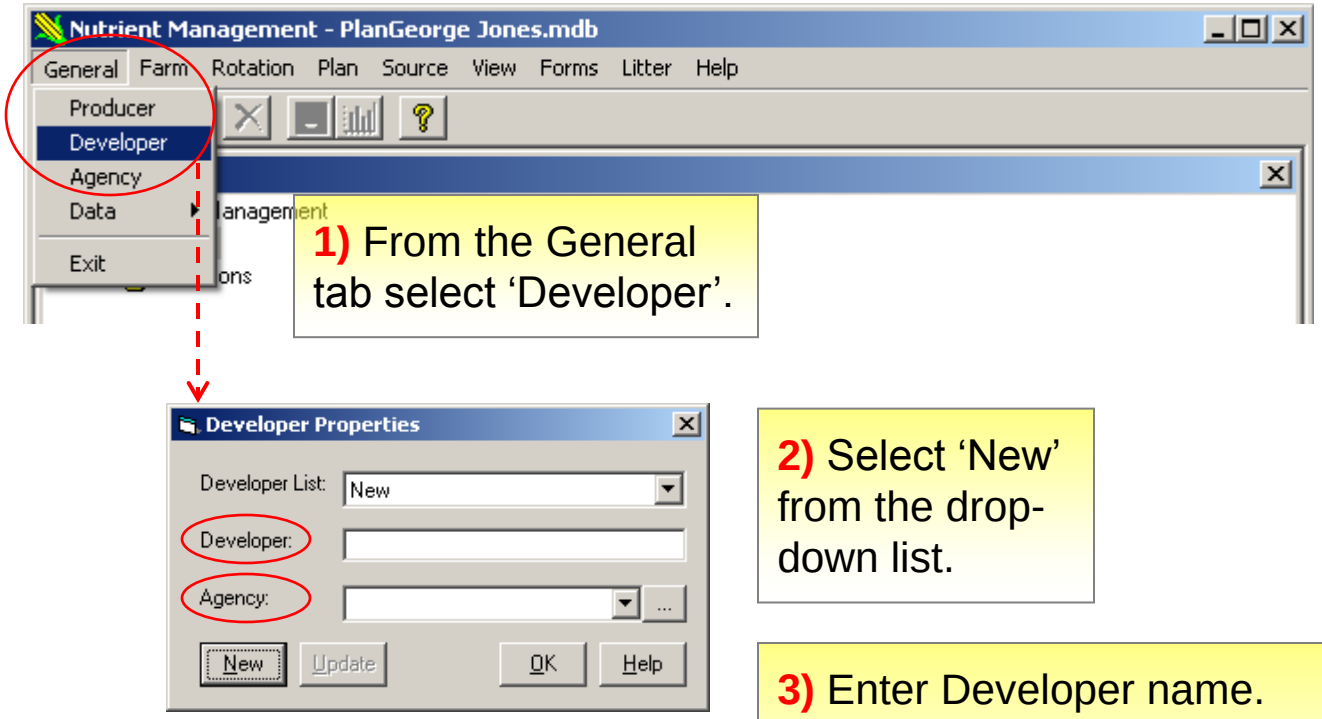


Begin by Using the Main Screen Tabs to enter basic information.

Main Screen – Agency



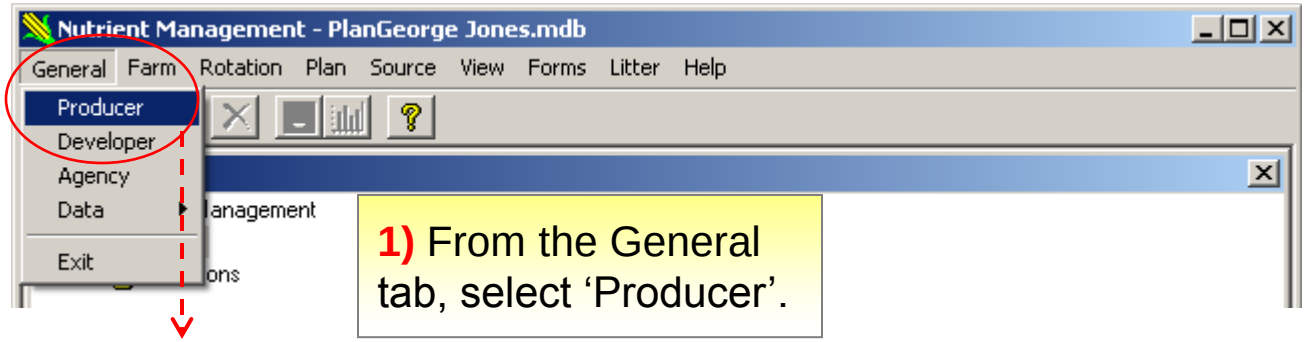
Main Screen – Developer



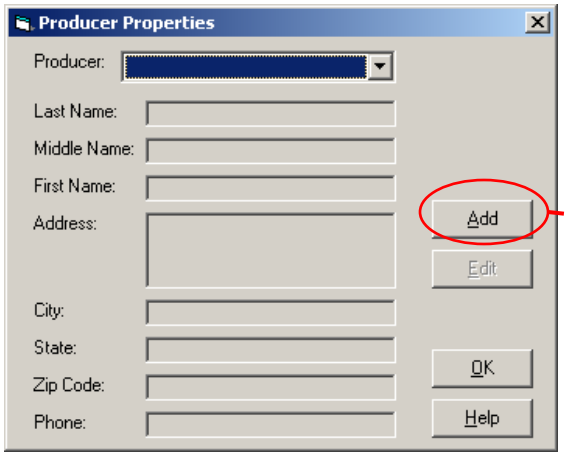
2) Select 'New' from the drop-down list.

3) Enter Developer name.
4) select corresponding Agency from that drop-down list and click 'OK' to save

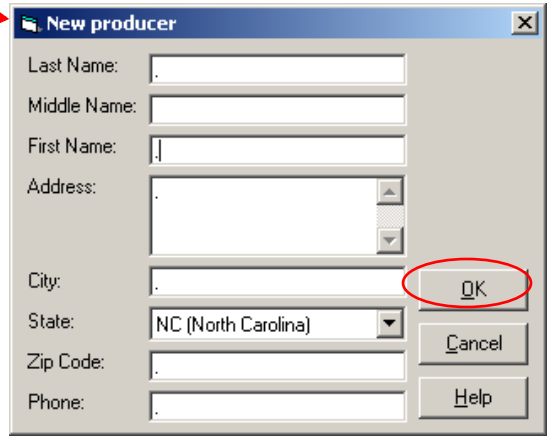
Main Screen – Producer



1) From the General tab, select 'Producer'.

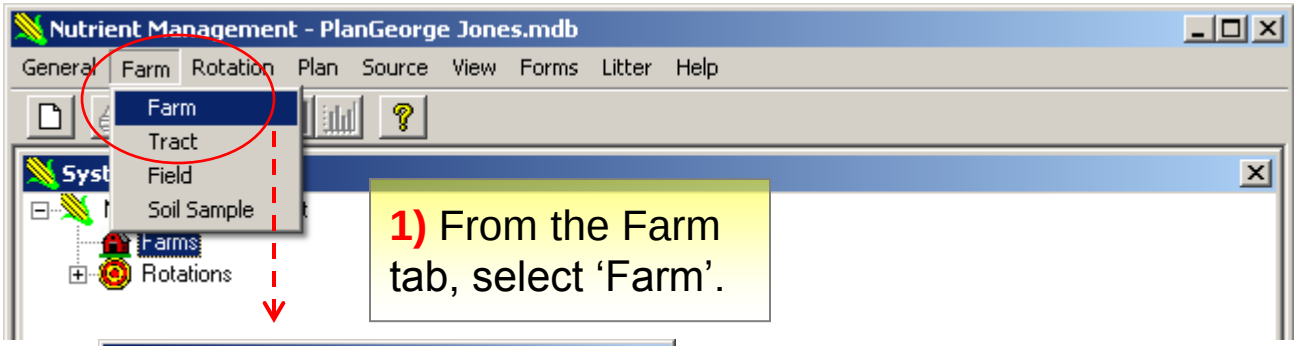


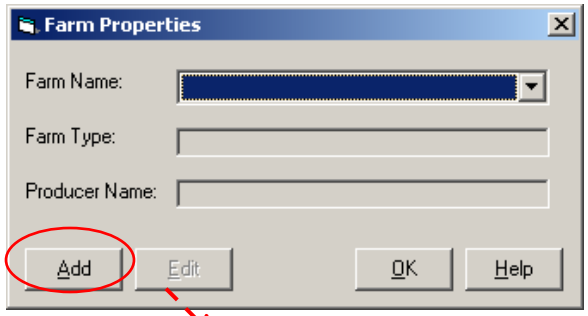
2) Use the <Add> button to Add a new Producer

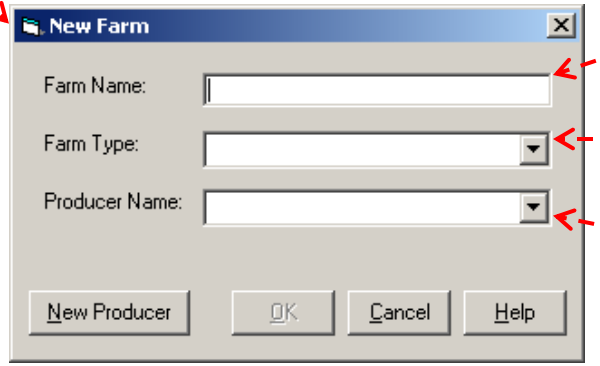


3) Enter all producer information and click <OK> to save

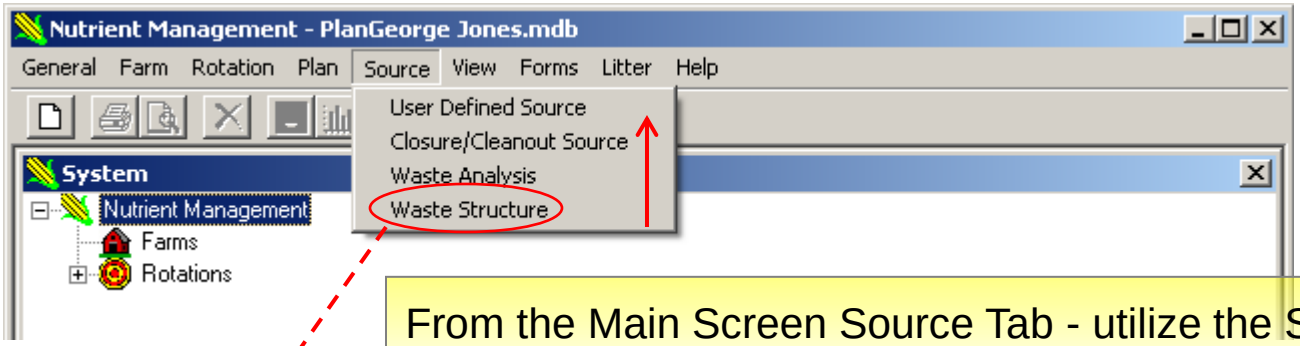
Main Screen – Farm



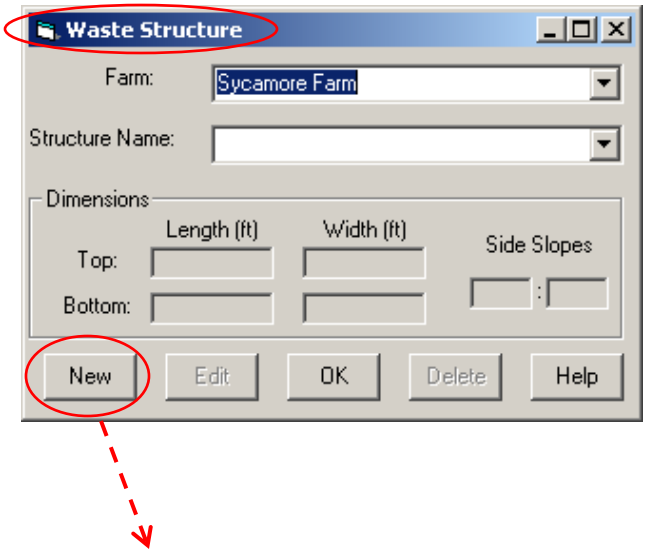




Source – Waste Structure



From the Main Screen Source Tab - utilize the Source drop-down menu items in reverse order (i.e. from bottom to top).



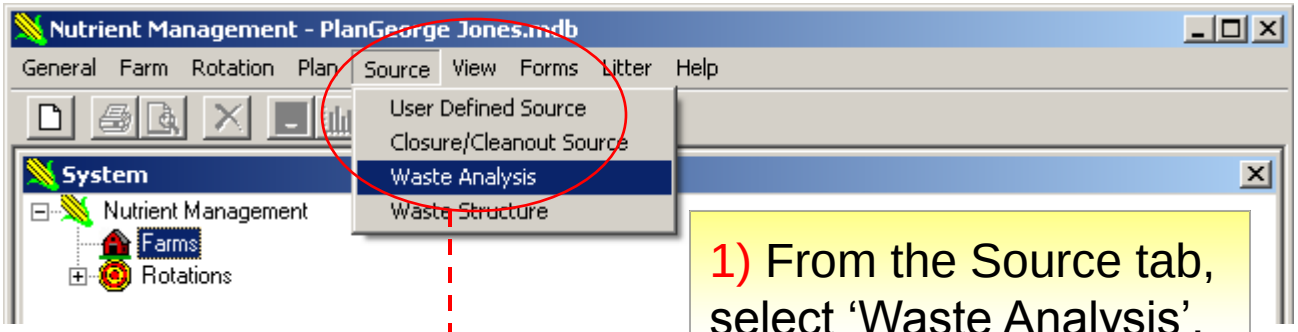
1) Begin by selecting 'Waste Structure'.
2) Identify the appropriate Farm from the drop-down menu.
3) Use the 'New' button to identify a new waste structure.

Source – Waste Structure

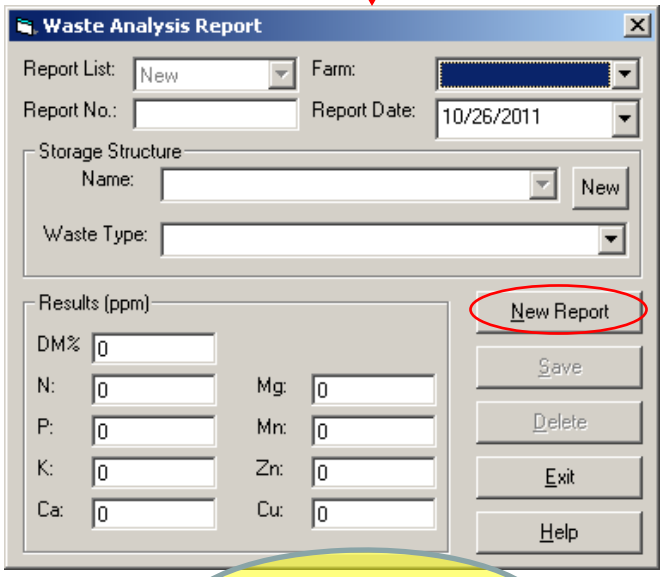
*Note: the dimension information is for identification and information purposes only, it is not used in program volume calculations.

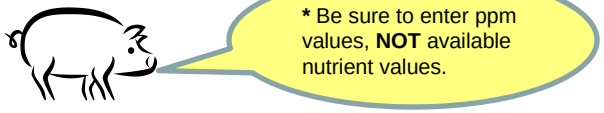
1) Label the structure under ‘Structure Name’.
2) Provide length and width dimensions for the Top and Bottom of the Structure.
3) Provide Side Slopes.
4) Click ‘OK’ when information is complete.

Source – Waste Analysis



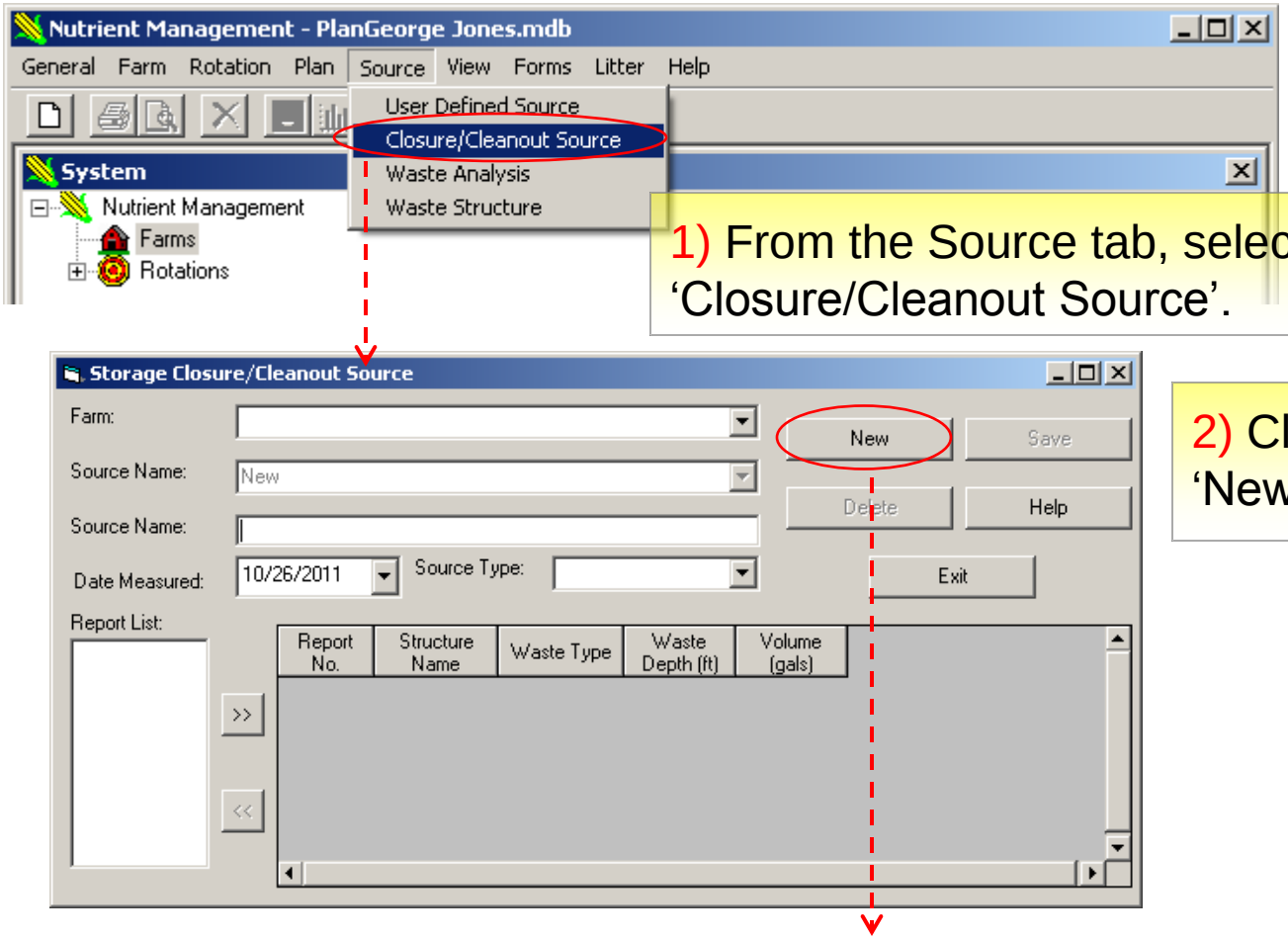
1) From the Source tab, select 'Waste Analysis'.



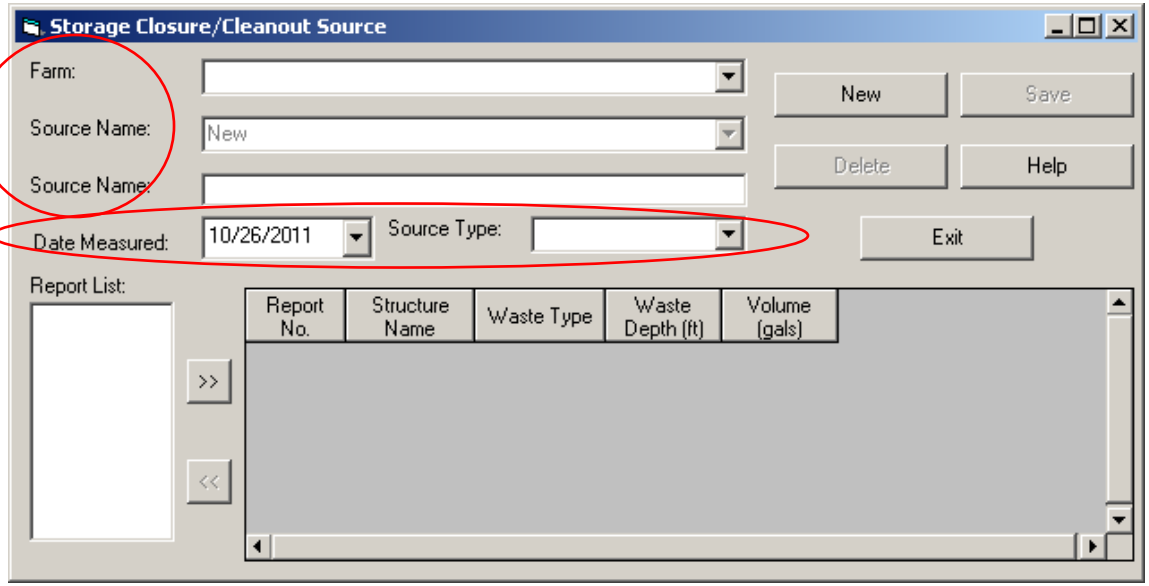


2) Click on 'New Report'
3) Select Farm from the drop-down menu.
4) Enter the Report No. and Date
5) Select the corresponding Storage Structure Name and Waste Type
6) Enter nutrient value results in **parts per million**. (Dry matter % is optional). Use 'Save' to save data and 'Exit' to exit report screen.

Source – Closure/Cleanout Source

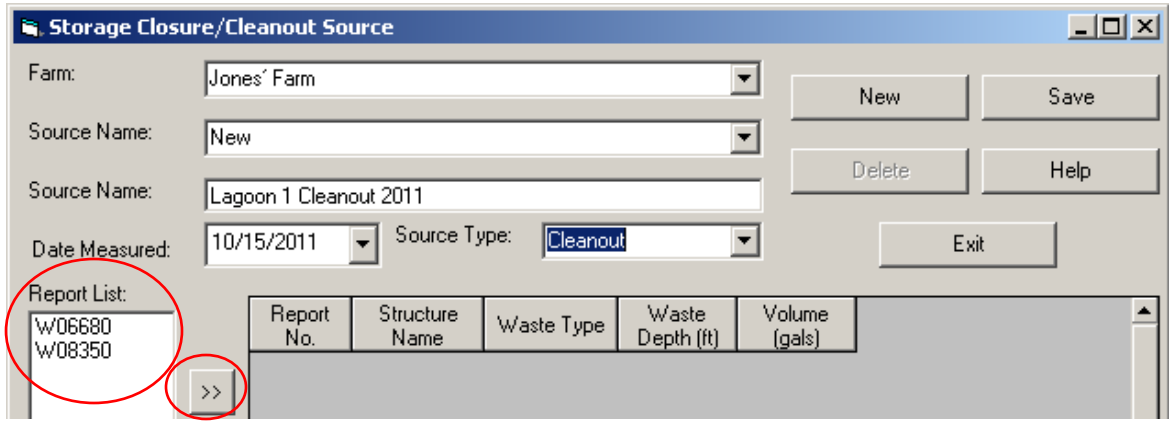


Source – Closure/Cleanout Source



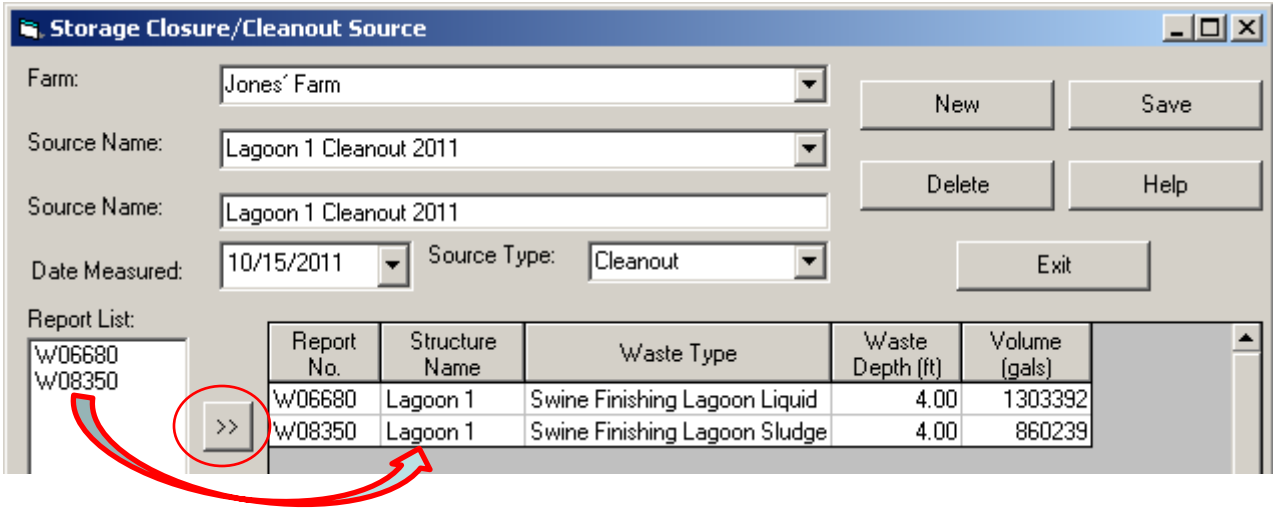
1) Select the Farm from the drop-down menu.
2) Enter a name for the source in the second Source Name box.
3) Use the drop-down calendar to enter the Date Measured.
4) Select the appropriate Source Type (closure or cleanout).

Source – Closure/Cleanout Source

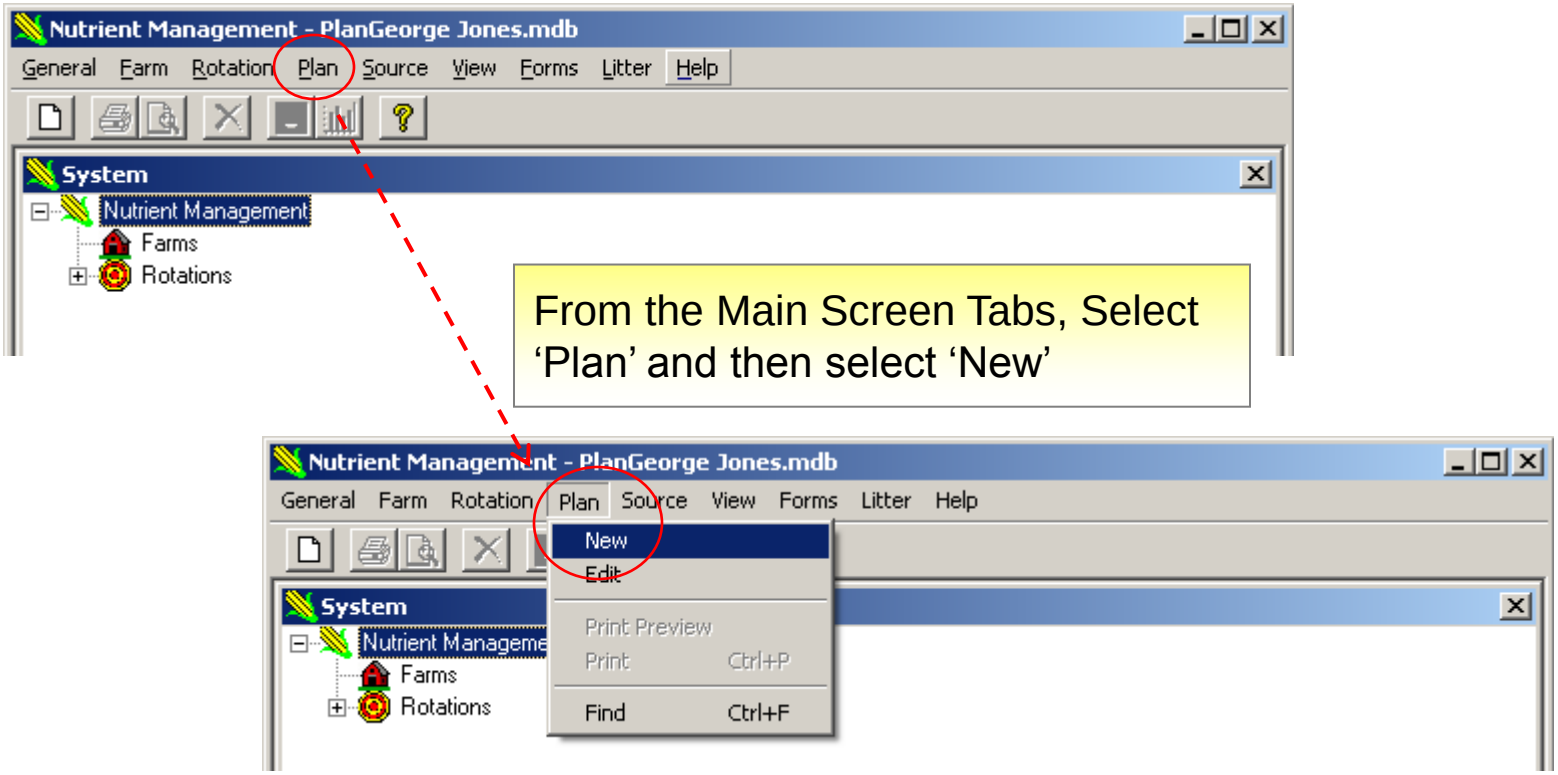


5) From the Report List, use >> to move the report to the list in the center.
6) Add Waste Depth (in feet) and Waste Volume (in gallons).
7) Use 'Save' to save the source under the name chosen in 'Source Name'.

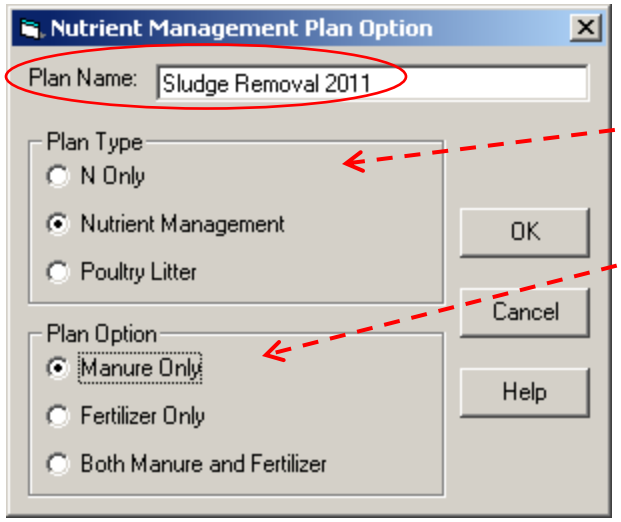
This example assumes separate liquid and sludge waste samples were taken. Alternatively, for a single composite sample only one waste type is identified.



Create a New Plan



Choose Plan Option

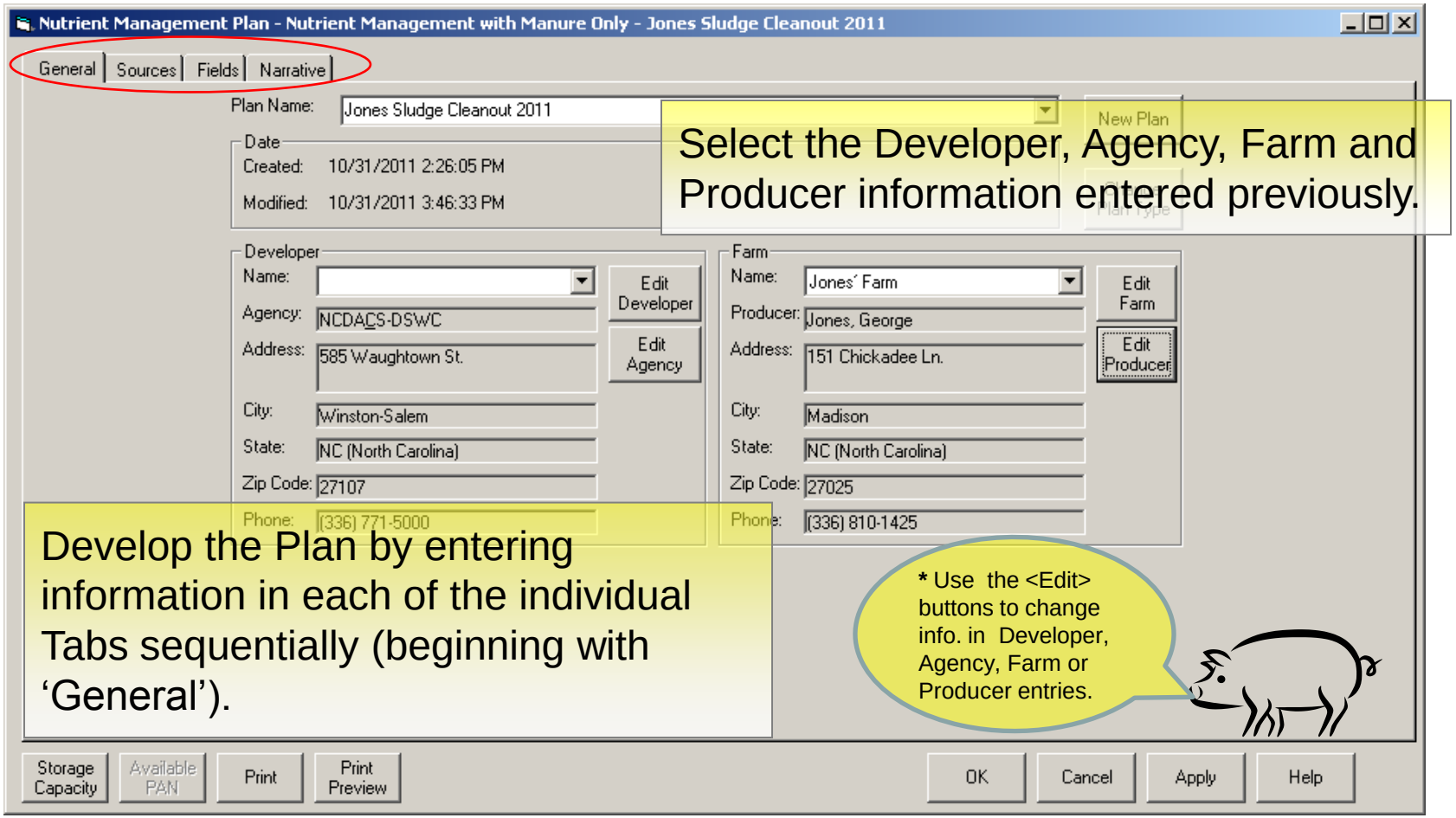


Name the Plan and then select ‘Plan Type’ and ‘Plan Option’

Click <OK> to activate the Plan Screen

The Plan Screen – General Tab

Note the main tabs: General, Sources, Fields, Narrative

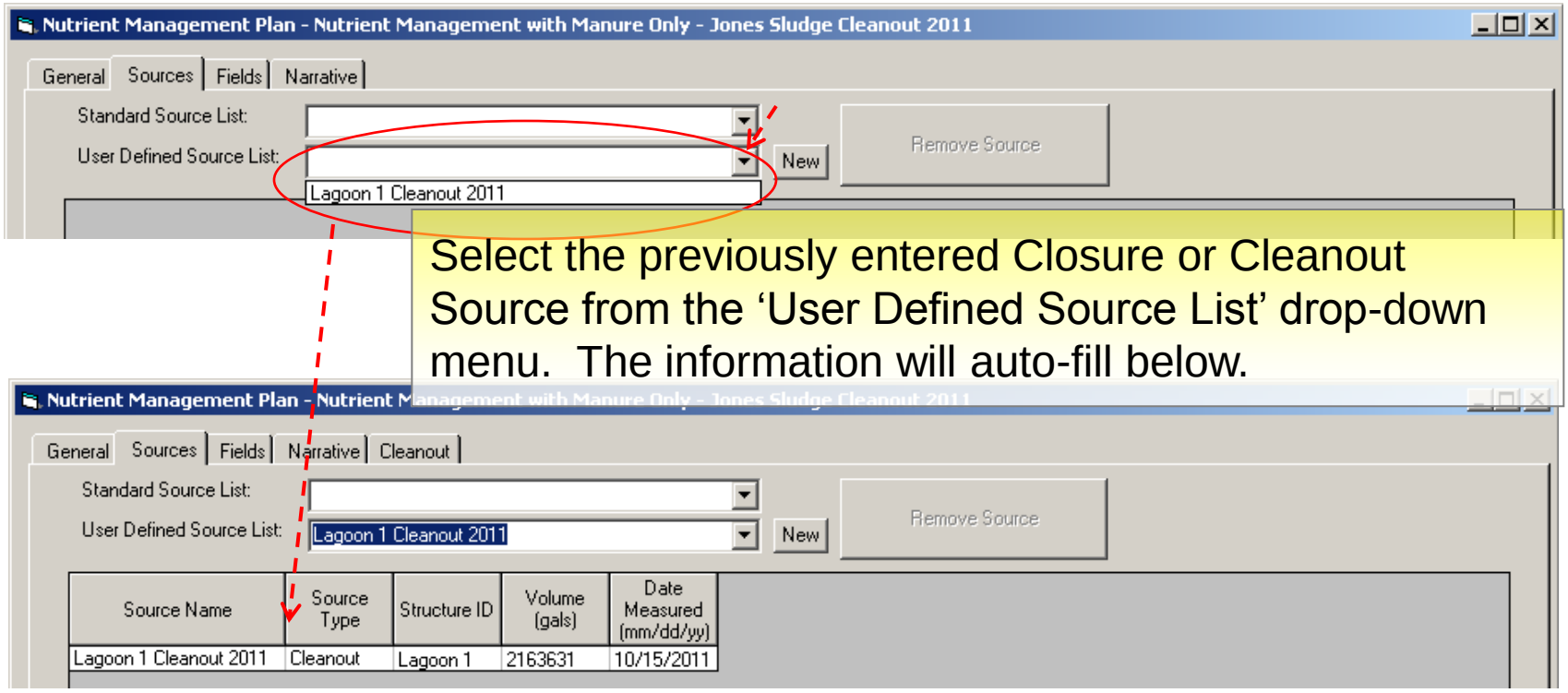


Select the Developer, Agency, Farm and Producer information entered previously.

Develop the Plan by entering information in each of the individual Tabs sequentially (beginning with 'General').

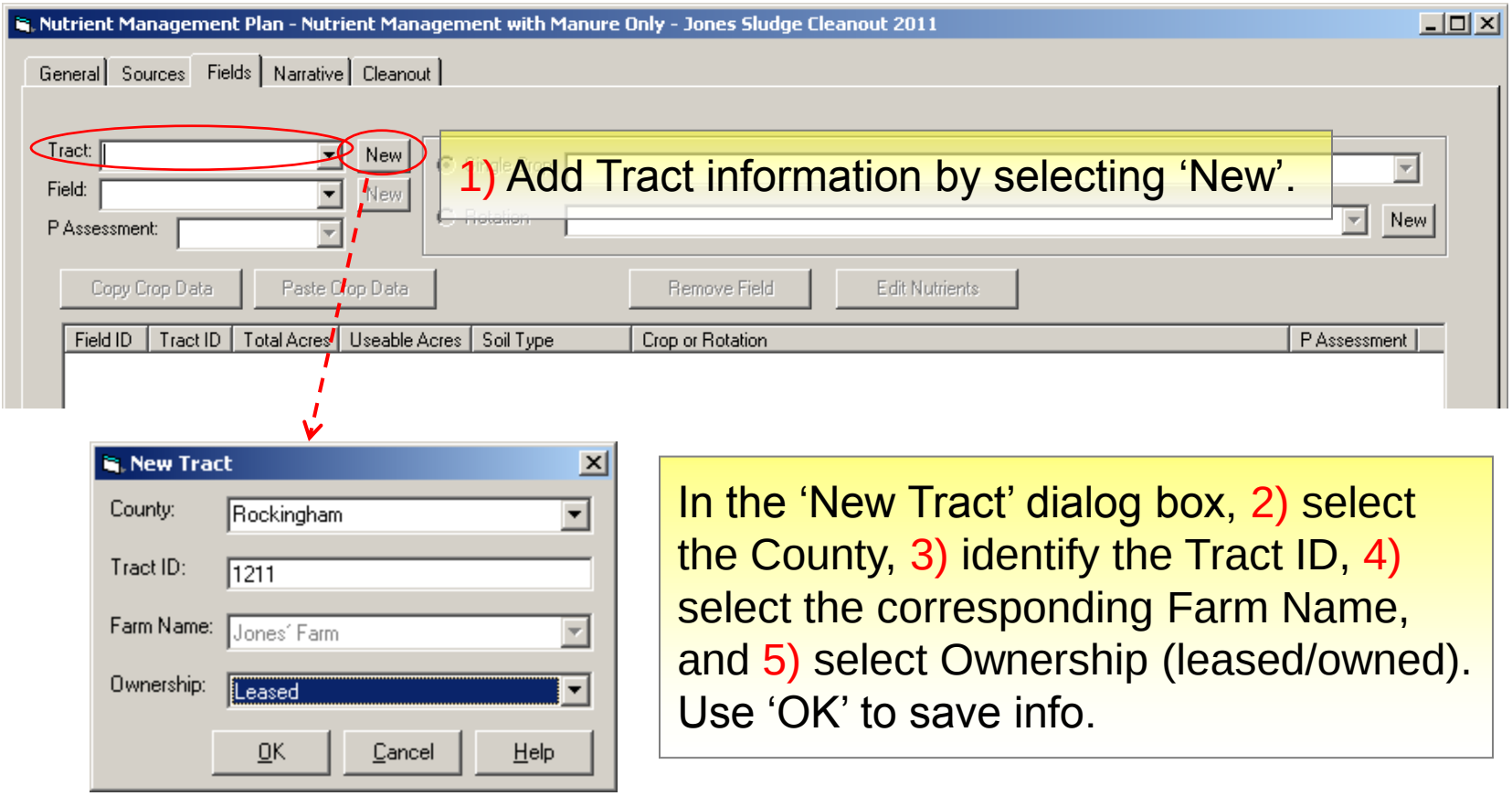
***** Use the <Edit> buttons to change info. in Developer, Agency, Farm or Producer entries.

The Sources Tab



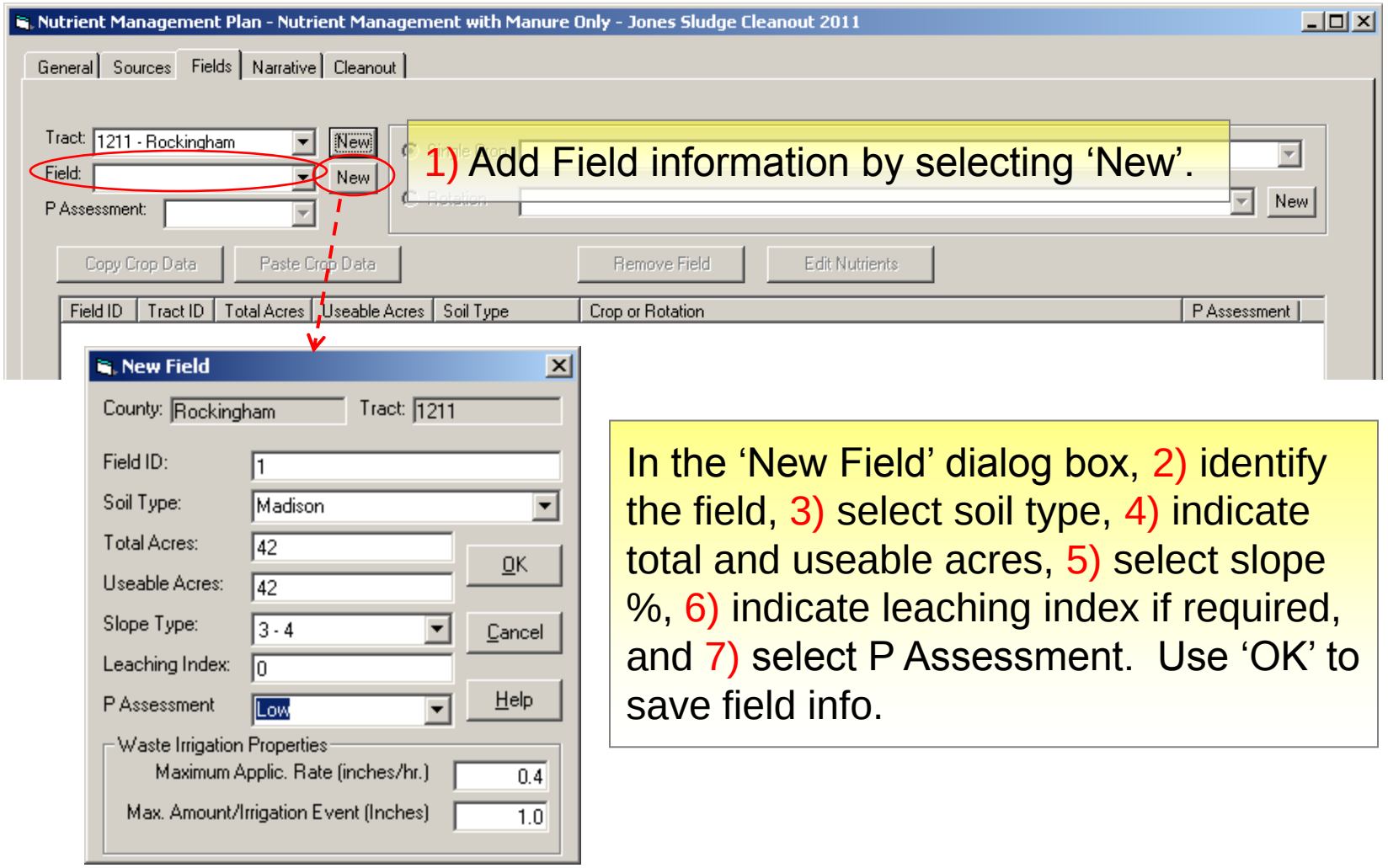
In this example separate liquid and sludge components were identified. The Program used this separate volume and nutrient analysis information to generate a combined weighted average of total volume and nutrients. The assumption here is that the sludge and liquid layers will be agitated together and then land-applied.

Add Tract Information



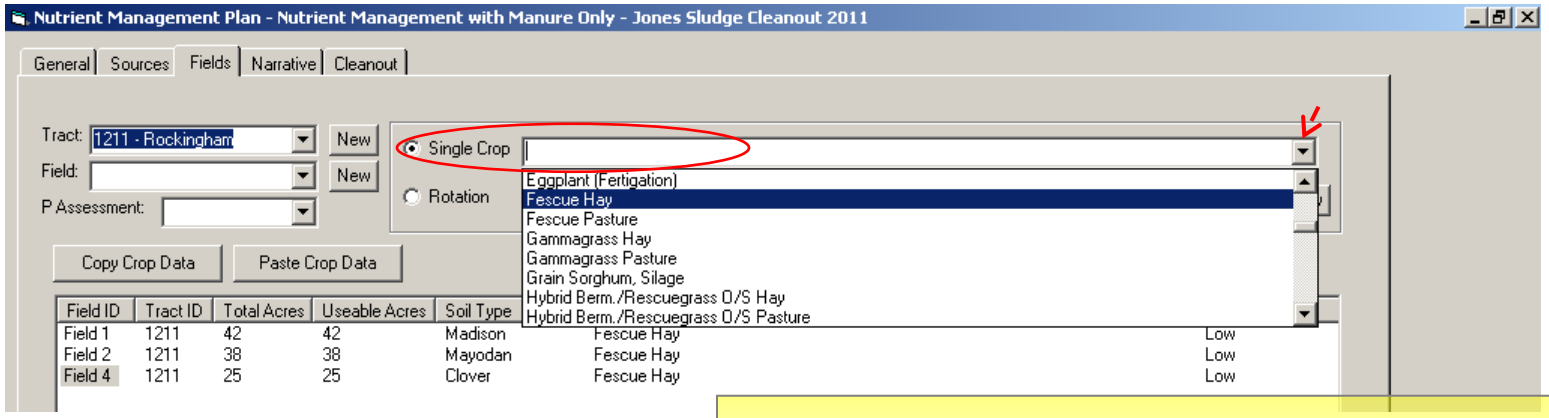
In the 'New Tract' dialog box, 2) select the County, 3) identify the Tract ID, 4) select the corresponding Farm Name, and 5) select Ownership (leased/owned). Use 'OK' to save info.

Add Field Information



In the 'New Field' dialog box, 2) identify the field, 3) select soil type, 4) indicate total and useable acres, 5) select slope %, 6) indicate leaching index if required, and 7) select P Assessment. Use 'OK' to save field info.

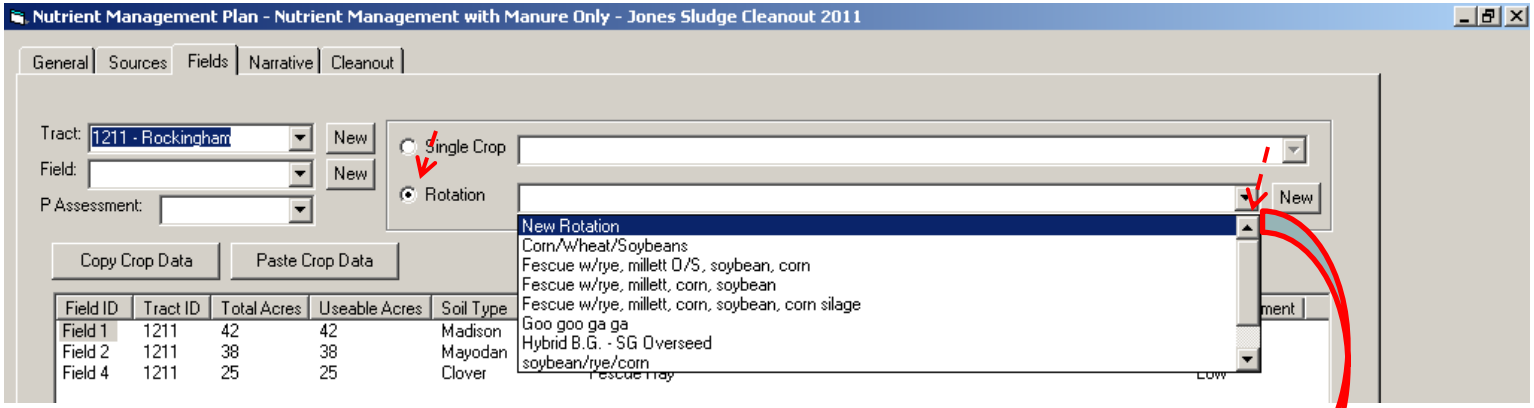
Crops/Rotations



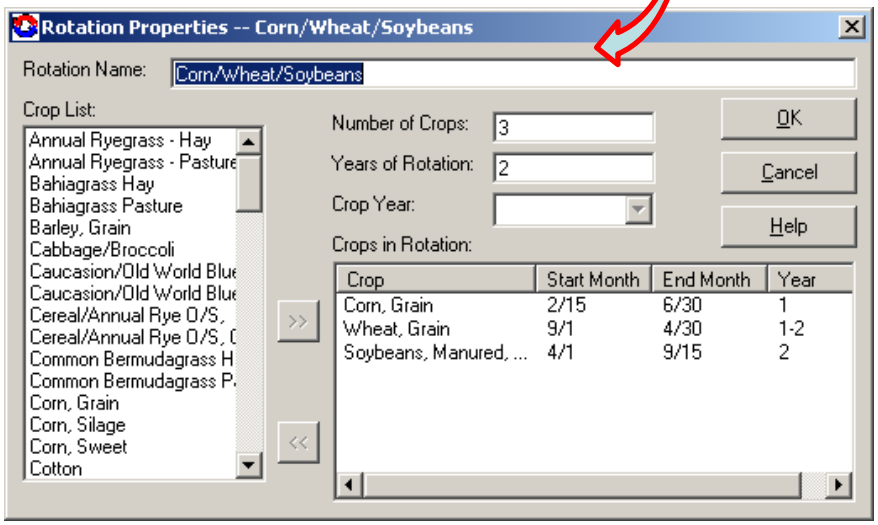
For each field, 1) select the field under Field ID, 2) identify the single crop or rotation for that field.

Crops/Rotations

To build a new rotation: 1) click on the circle next to ‘Rotation’, 2) select ‘New Rotation’ from the drop-down list.



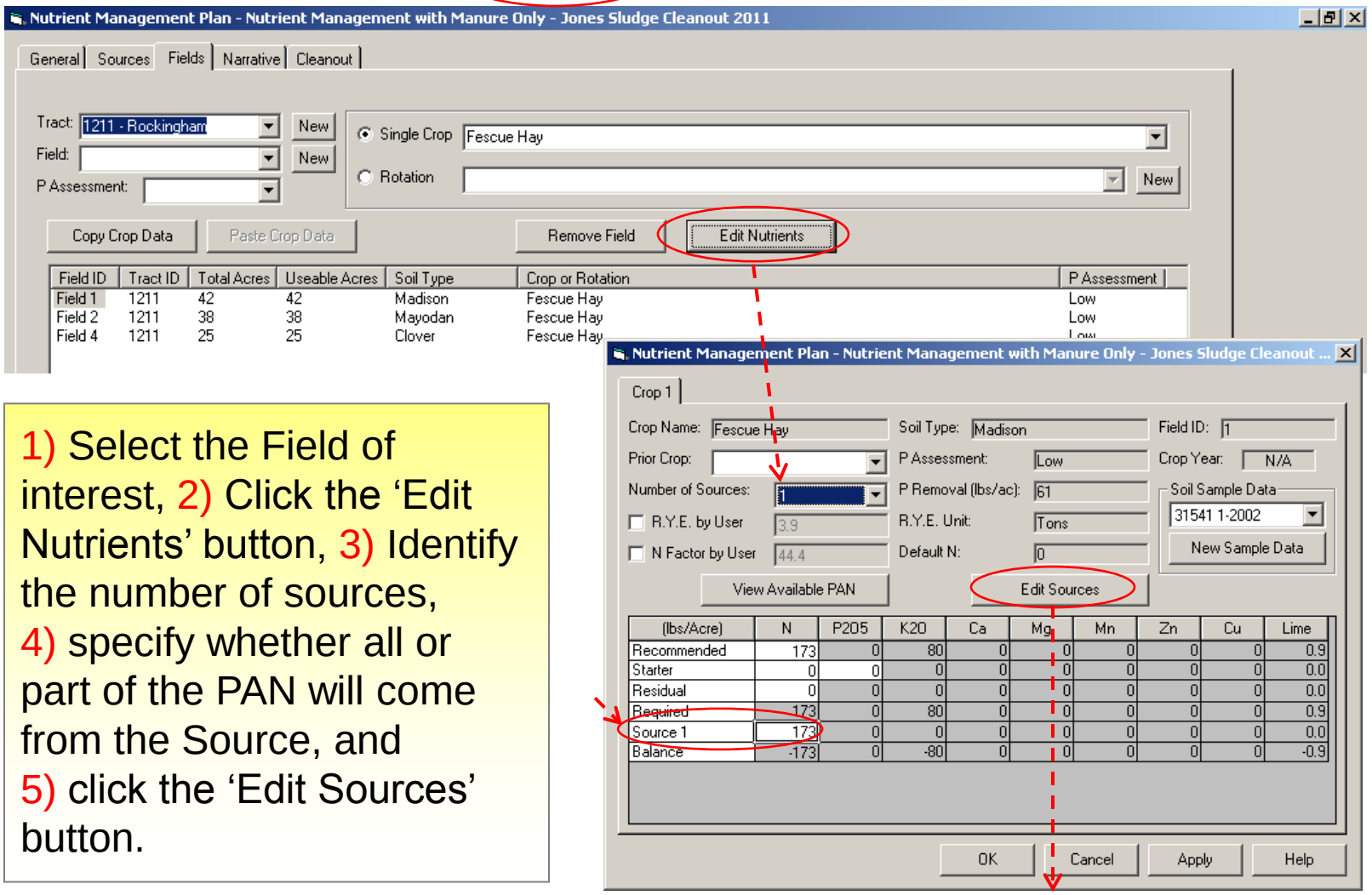
In the Rotation Properties dialog box, 3) name the rotation and identify the number of crops and years, 4) move crops from the crop list to the Crops in Rotation list using the >> button. Click ‘OK’ to save data.



Edit Nutrients

Step 1

3-Step Process: Edit Nutrients > Edit Sources > Application %

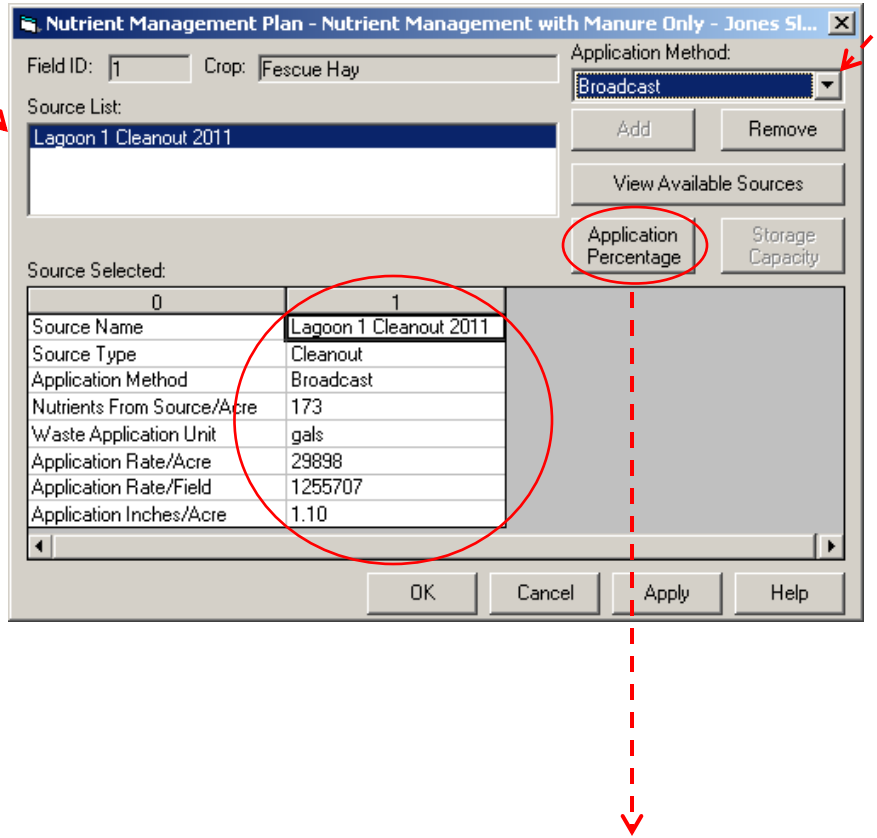


1) Select the Field of interest, 2) Click the 'Edit Nutrients' button, 3) Identify the number of sources, 4) specify whether all or part of the PAN will come from the Source, and 5) click the 'Edit Sources' button.

Edit Sources

Step 2

3-Step Process: Edit Nutrients > Edit Sources > Application %



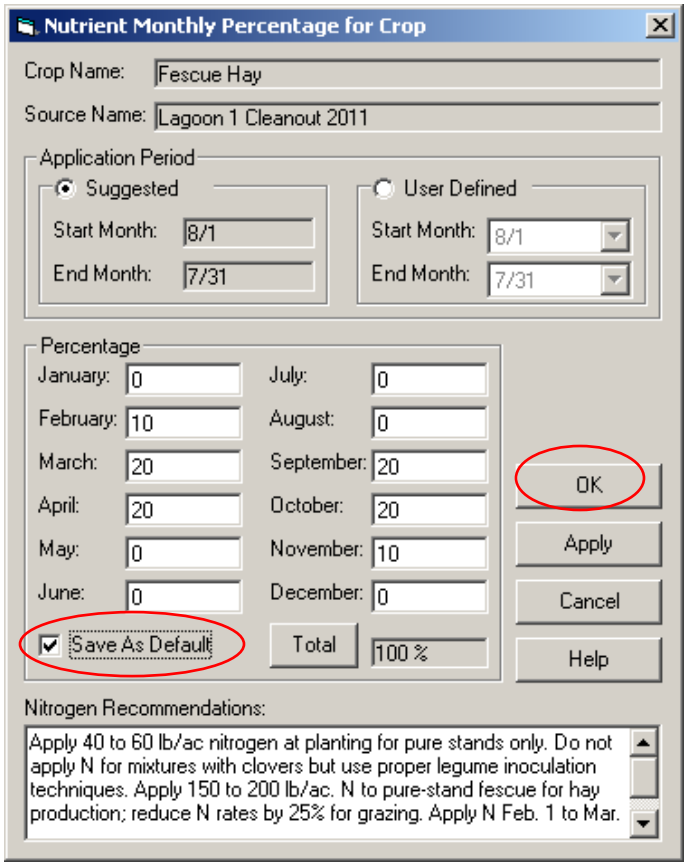
1) Be sure the Source is highlighted in the Source List, 2) Select the Application Method, 3) verify the information that auto-fills under Source Selected, and 4) click the 'Application Percentage' button.

Application Percentage

Step 3

3-Step Process: Edit Nutrients > Edit Sources > Application %

1) Assign monthly application percentages, (based on crop nutrient needs and site specific production practices), 2) total monthly percentages to 100%, 3) select 'Save As Default' to apply the percentages-by-month to all fields in the Plan with the same crop when the same nutrient source is selected, 4) use the 'OK' button when information is complete.



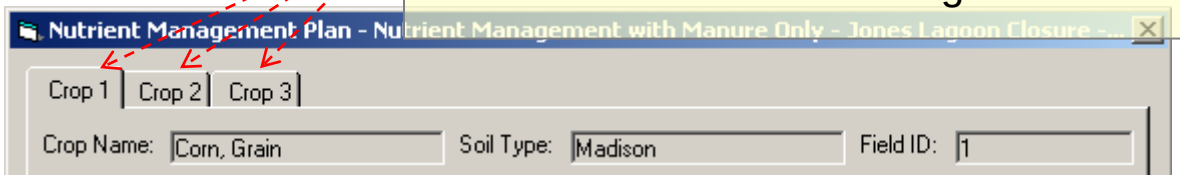
Application Percentage

Step 1 → Step 2 → Step 3

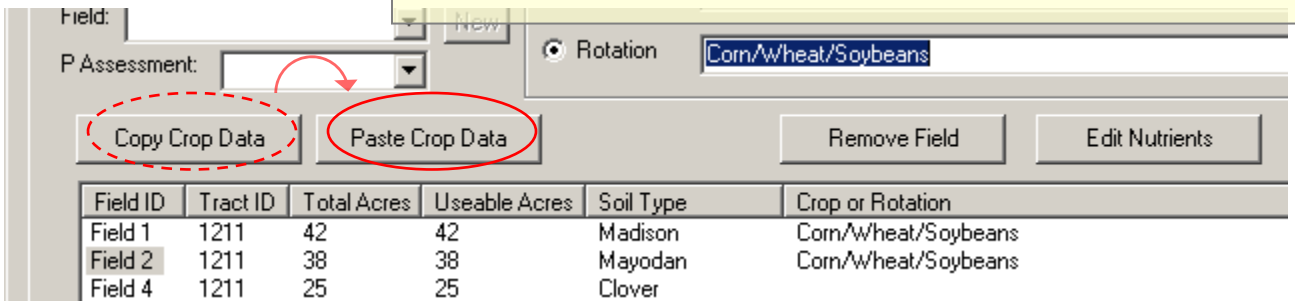
3-Step Process: Edit Nutrients > Edit Sources > Application %

Repeat the 3-Step process for all crops/rotations in all fields in the Plan.

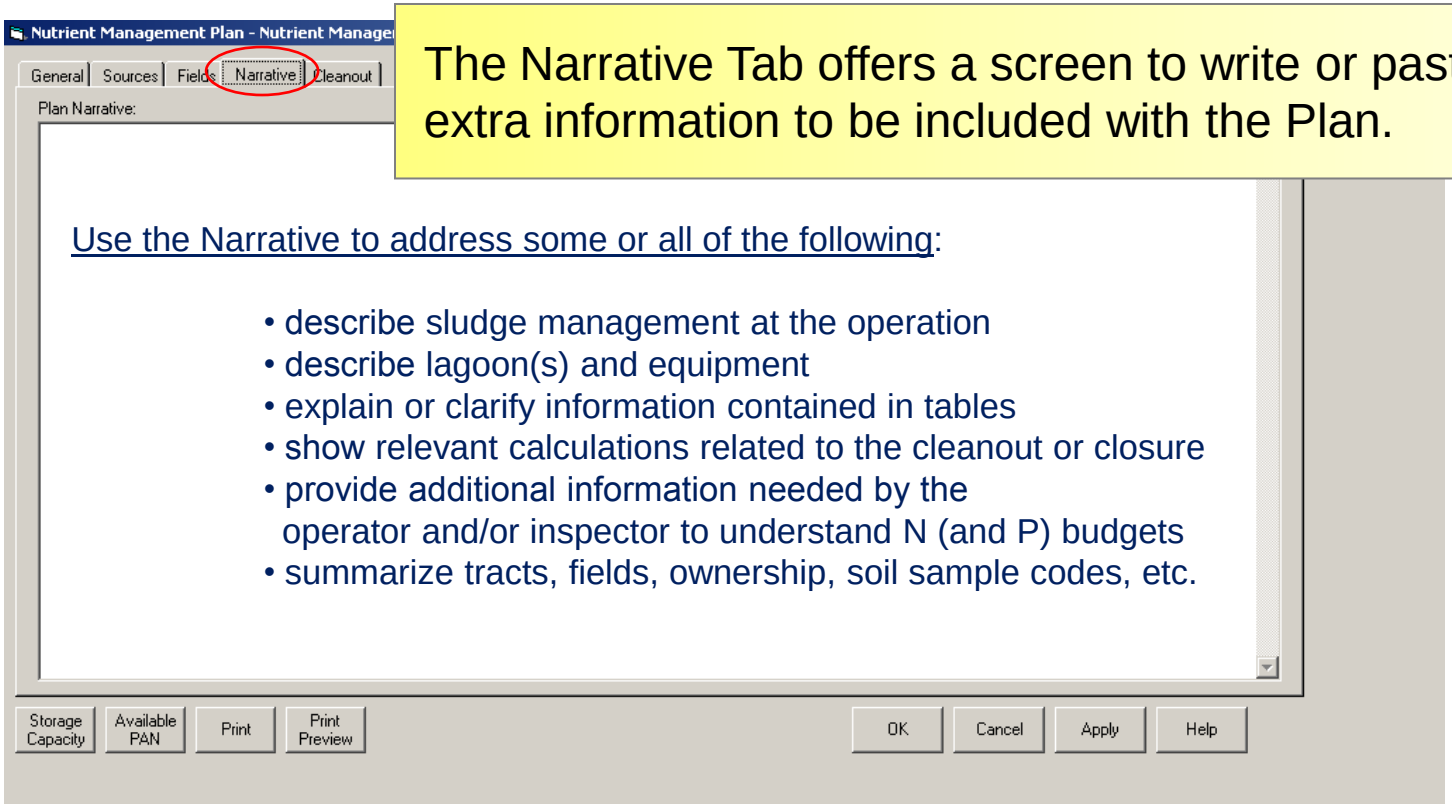
Be sure to complete the process for all members of a rotation in a given field!



Use the Copy Crop Data button to copy the completed 'Edit Nutrients' information from a field to other fields with the same crop or rotation assigned.



Narrative



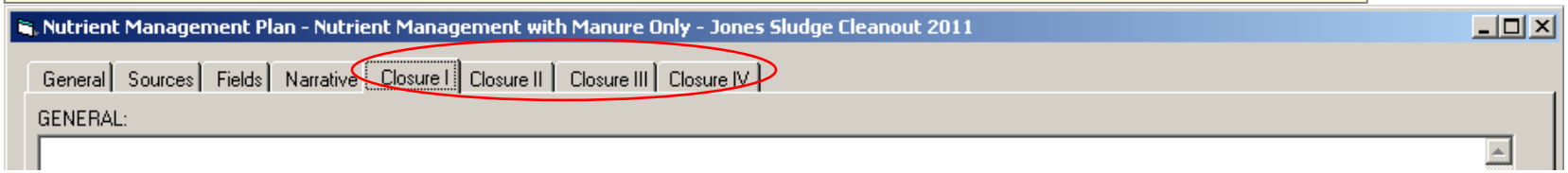
The Narrative Tab offers a screen to write or paste extra information to be included with the Plan.

Cleanout and Closure Tabs

In this **Cleanout** example a tab entitled ‘Cleanout’ appears when the User Defined Source is identified in the Sources tab. Include general Lagoon Cleanout information here.

In a **Closure Plan** option there will be four Closure tabs:

Tab I – General Info.
Tab II – Closeout Condition and Removal of Inflow Devices
Tab III – Installation of Spillway and Description of Buffers and Setbacks
Tab IV – List of Attachments and Other info.



Print Preview & Print

Use ‘Print Preview’ to view sections of the Plan separately. Individual sections can also be printed from the Preview Screen. Use ‘Print’ to print the entire Plan at once.